REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and these remarks.

A. Status of the Claims

Claims 1, 3 and 29 are amended presently to include the phrase "by an inductively coupled plasma mass spectrometer or an inductively coupled plasma optical emission spectrometer." Support for this revision can be found throughout the specification, particularly in paragraphs [0040]-[0042] and in the Examples. Claims 1, 3 and 29 also are amended to recite details of the instructions. Support for these amendments can be found in the specification, *e.g.*, in paragraphs [0060]-[0070], the Examples and the original claims. Finally, claims 1, 3 and 29 are amended by prescribe a "tag-organic moiety complex." Relevant support is found, *inter alia*, in paragraphs [0155]-[0157] of the specification.

Upon entry of this response, claims 1-14, 20-27 and 29 will be pending.

B. Interview

Applicants thank Examiner Cook and Supervisor Shibuya for their discussion of the present invention and the cited art with Applicants' representative, Victoria Statham, and inventor Dr. Scott Tanner on June 24, 2009. Applicants note that an Interview Summary has not been issued or made of record by the Examiner.

As requested by the Examiner and the Supervisor, claims 1, 3 and 29 were amended by adding the limitation of using an inductively coupled plasma mass spectrometer or an inductively coupled plasma optical emission spectrometer. This limitation appears in both the preamble and the body of the claims as part of the instructions. As discussed in the June 24th interview and in more detail below, MPEP 2111.02 stipulates that the preamble can carry patentable weight. Further, *In re Gulack*, 703 F.2d 1381 (Fed. Cir. 1983), clearly indicates that the recitation of instructions can have patentable weight in a kit claim (see further discussion, below).

To clarify the "tag" feature, Applicants also revised claims 1, 3, and 29 to recite "tag-organic moiety complex," in keeping with paragraphs [0167], [0168], and [0169] of the specification. As discussed in the June 24th interview, the organic moiety acts to link or bind the element tag to the biological moiety.

C. Claim Rejections Under 35 U.S.C. § 103(a)

The Examiner rejected claims 1-5, 20-21 and 23-25 for alleged obviousness over Cais, USP 4,205,952, in view of Shan et al., *Proc. Nat'l Acad. USA* 97: 2445-49 (2000). Applicants respectfully traverse this rejection.

I. The cited art does not teach each and every limitation of the claimed invention.

In the Office Action, the Examiner asserts Cais teaches the use of transition elements to tag biological molecules, and further applies Shan to teach detection of isotopes using mass spectrometry. The Examiner further states that "[a]bsent evidence to the contrary, they necessarily teach the positive charged characteristic." Office Action, page 5.

To establish a prima facie obviousness of the claimed invention, however, the prior art must teach or suggest all of the claim limitations. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974). Applicants assert that this burden has not been met here.

To begin, the cited art fails to teach the detection and measurement of a positively charged transition element in a sample. The secondary reference teaches measurement of the 14C isotope, using accelerator mass spectrometry. But 14C is not a transition element, as required by the claims. Furthermore, Cais does not teach the detection of an isotope of a transition element, and in fact teaches away from it, as discussed in more detail in the next section. Therefore, the references, alone or in combination, fail to teach a tag-organic moiety complex, wherein the tag is an isotope of a transition element, as claimed.

Additionally, Shan *et al.* measures a *negative* 14C ion, not a positive ion as the claims require. As explained by Dr. Tanner during the June 24th interview, Shan uses accelerator mass spectrometry for 14C analysis, during which negative ions of carbon are produced in order to suppress the 14N isobaric interference. To further evidence this distinction between the methods of Shan and the positively charged transition element as claimed, U.S. Patent No. 5,508,515 is provided in appended Exhibit A.

Further, Shan *et al.* does not use an isotopic tag to label a biologically active material. Rather, the 14C is measured as a component of pesticide molecules in solution to which untagged antibodies bind. The antibodies "pull down" the labeled analyte.

It is apparent that neither Cais nor Shan suggests employing isotopes of positively charged transition elements to tag biologically active materials. After the techniques of Shan were explained at the June 24th interview, both Examiner Cook and Supervisor Shibuya acknowledged this deficiency of the cited art .

Furthermore, the cited art does not teach the detection and measurement of a positively charged transition element in a sample by an inductively coupled plasma mass spectrometer (ISCP-MS) or by an inductively coupled plasma optical emission spectrometer (ICP-OEM), as the claims prescribe. More specifically, the present "kit" claims are qualified along these lines both in the preamble and, as discussed below, in the recitation relating to instructions.

Section 2111.02 of the M.P.E.P. mandates that the preamble must be given patentable weight if the recited purpose or intended use results in a "structural" or "manipulative" difference between the claimed invention and the prior art. Here, the kit detects the tagged biological molecules of the invention through the use of ICP-MS or ICP-OEM, both of which differ from the prior-art methodology, as explained above, and are required to detect a tagged biological molecule in accordance with the claimed invention.

Likewise, instructions for using the kit, including use of ICP-MS or ICP-OEM to detect the tagged biological molecule has been added. While the printed matter of a kit do not necessarily have patentable weight, the Federal Circuit has stated the patentable weight of the printed matter of a kit depends on "whether there exists any new and unobvious functional relationship between the printed matter and the substrate." *In re Gulack*, 703 F.2d 1381, 1386 (Fed. Cir. 1983). Indeed the Board of Patent Appeals and Interferences has adopted this test, as discussed in *Ex Parte Roger A. Hansen*, appeal 2007-3424, slip op. (BPAI 2008) (copy appended as Exhibit B). Applicants submit that ICP-MS and ICP-OEM provide such a functional relationship because the alternative detection methods cited by the Examiner cannot detect the tagged biological molecules provided in the claimed kits. Indeed, as Dr. Tanner explained during the June 24th interview, it is surprising that the large biologically active molecules can be tagged and detected in the manner claimed, as the recited techniques are used conventionally to detect small molecules, *e.g.*, in water samples, while biologically active molecules traditionally have been analyzed via the alternative spectrometry techniques disclosed in the cited art.

Moreover, as discussed above, Applicants submit that the cited art cannot detect a positively charged transition element tagged to a biological molecule, as claimed. As requested

by the Examiner and the Supervisor, the detection methodology, ICP-MS and ICP-OEM, has been incorporated to facilitate their review of the art. Applicants maintain, however, the art of record cannot render the present claims obvious because no permutation of their teachings could have reasonably suggested each of the claim limitations. Accordingly, Applicants request withdrawal of the rejection.

II. Cais teaches away from the claimed invention and cannot be combined with Shan.

While discussing Cais, the Examiner acknowledges that Cais does not teach the use of *isotopes* of transition elements as tags, as required by the instant claims. She states that "Cais is is silent with respect to isotopes." Office Action, page 5, an assertion with which the Applicants continue to disagree. Alleging that Shan compensates for this deficiency, the Examiner states:

> It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to utilize isotopes as taught by Shan *et al.* in the assay method/reagents of Cais ... because Shan *et al.* taught that isotopic labeling can be incorporation into analytes without altering the structure or reactivity. See abstract. Further isotope-labeled immunoassays will allow for ultra sensitive assay that will obtain a better understanding of antibody properties. See Shan *et al.* page 2445, 2nd column 2nd paragraph.

Office Action, page 6.

Applicants' previous responses, have emphasized that Cais is not merely "silent" about but actually teaches away from isotopes in the present context. Applicants' representative raise the point again at the July 24th interview, when Dr. Tanner commented as well.

That Cais did not use isotopes is evidenced both his explicit commentary on point and by the fact that he measured his element by atomic absorption spectrometry (for example, see reference at column 4, line 50, column 5, lines 48-55, column 7, line 1, and column 12, line 8). Simply put, Cais' methodology cannot detect and distinguish isotopes. Rather, as Applicants discovered and teach in their application, a more discriminating method of detection, such as mass spectrometry, must be employed for this purpose.

Cais teaches away from using mass spectrometry by noting "various degrees of non-specificity and interferences" whereby mass spectrometry "techniques could not be practically applicable" (column 1, lines 28-36). As discussed in MPEP § 2143.01(V), the

proposed modification cannot render the prior art unsatisfactory for its intended purpose. *See also Takeda Chem Indus. v. Alphapharm Ltd.*, 492 F3d 1350 (Fed. Cir. 2007). Here, Cais specifically states that mass spectrometry is *undesirable,* but the proposed modification of Shan requires the use of mass spectrometry to detect the label. As a matter of law, therefore, Cais cannot be modified in the manner asserted by the Examiner. Furthermore, the Examiner has never addressed this issue, leaving Applicants' position unrebutted on the record.

III. The secondary references do not overcome the deficiencies of Cais in view of Shan.

The Examiner applies additional references to the Cais/Shan combination discussed above in the attempt to teach specific limitations recited by dependent claims. The Examiner does not propose these references teach or suggest the features of the independent claims, and Applicants likewise assert they do not. Accordingly, these references are addressed collectively.

The Examiner states that Cais as supported by Shan *et al.* differs from the claims 6-9 in not specifically teaching reagent immobilization, but alleges Maggio (*Immunoenz. Tech. I,* (1980), CRC Press, pp. 186-87) discloses enzyme immunoassays wherein either the antigen or antibody is immobilized onto a solid phase. Further, the Examiner alleges that Foster (USP 4,444,879) teaches various kit configurations including standards and buffers as required in claims 10-14. Regarding claim 29, the Examiner alleges that Neilsen (*Spectrochimica Acta Part B* (1998) 53: 339-45) discloses immunoelectrophoresis and laser ablation ICP-MS for the identification and quantification of (non-transitional) metal binding proteins in blood serum. Finally, the Examiner rejects claims 22, 26 and 27 over Cais and Shan, in view of Crooke (WO 99/451,450), stating that Crooke discloses the use of a "plurality" of tagged transition elements and biologically active materials.

As stated above and acknowledged by the Examiner and the Supervisor during the June 24th interview, Cais as supported by Shan *et al.* does not disclose or suggest a kit for the detection and measurement of a positively charged transition element in a sample comprising an isotopic tag for tagging a biologically active material with an isotope of a transition element and an organic moiety, nor instructions and packaging means. These additional cited references do not remedy the deficiencies of the Cais/Shan combination. Applicants request withdrawal of all rejections, therefore.

CONCLUSION

Applicants submit that this application is in condition for allowance, and an early indication to this effect is requested. Examiner Cook is invited to contact the undersigned directly, should she feel that any issue warrants further consideration.

The Commissioner is hereby authorized to charge any additional fees, which may be required under 37 C.F.R. §§ 1.16-1.17, and to credit any overpayment to Deposit Account No. 19-0741. Should no proper payment accompany this response, then the Commissioner is authorized to charge the unpaid amount to the same deposit account. If any extension is needed for timely acceptance of submitted papers, then Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorize payment of the relevant fee(s) from the deposit account.

Respectfully submitted,

Date 13 August 2009

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EXHIBIT A

US005508515A

United States Patent [19]

Enge

[11] **Patent Number: 5,508,515**

[45] **Date of Patent: Apr. 16, 1996**

[54] **MASS RECOMBINATOR FOR ACCELERATOR MASS SPECTROMETRY**

[76] Inventor: **Harald A. Enge**, 20 Nason Hill Rd., Sherborn, Mass. 01770

[21] Appl. No.: **398,758**

[22] Filed: **Mar. 6, 1995**

[51] **Int. Cl.**[6] **H01J 49/30**

[52] **U.S. Cl.** ..... **250/281**; 250/298; 250/396 ML

[58] **Field of Search** ..... 250/281, 288, 250/298, 396 ML

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,243,667	3/1966	Enge	317/200
4,425,506	1/1984	Brown et al.	250/396 ML
5,013,923	5/1991	Litherland et al.	250/396 R
5,118,936	6/1992	Purser	250/281

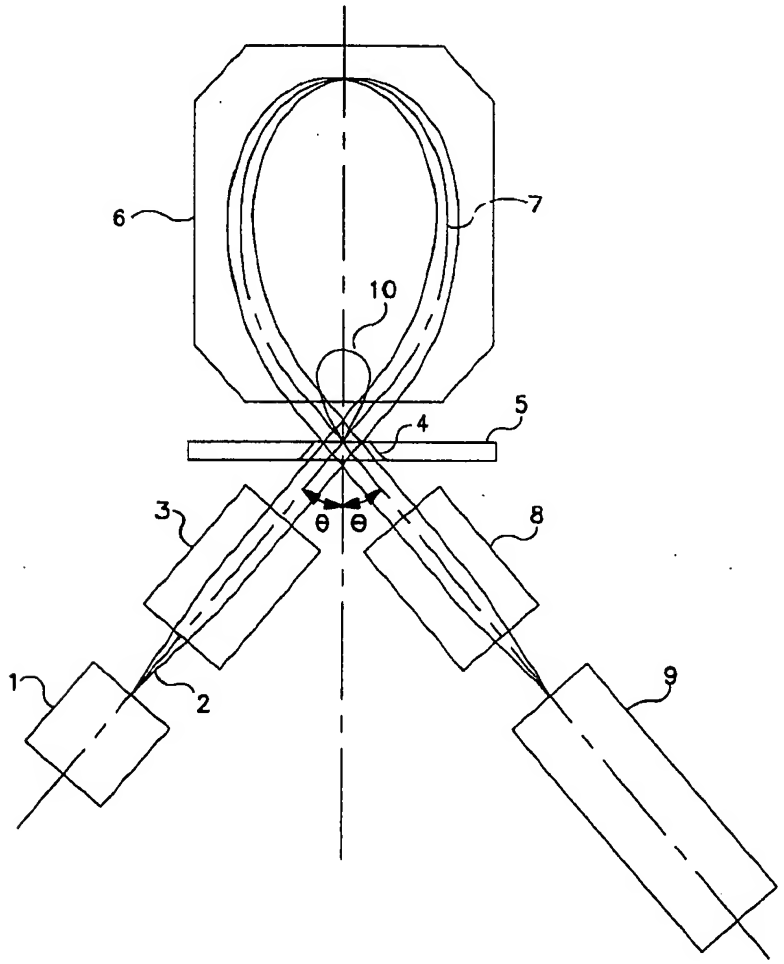
Primary Examiner—Jack I. Berman

Attorney, Agent, or Firm—Nields & Lemack

[57] **ABSTRACT**

A mass recombinator comprises a source of negative ions to be analyzed. These negative ions are accelerated to roughly the same moderate kinetic energy and electrostatically focused to a substantially parallel beam which enters the magnetic field of a dipole magnet at an angle of incidence. The field of the dipole magnet is designed to deflect a substantially parallel beam of negative ions having the same energy and entering at a specified angle of incidence in such a manner that it describes a loop of approximately 264.6 degrees, forming a mass spectrum at a position inside the magnet after deflection of approximately 132.3 degrees. The beam exits the field as a parallel beam substantially where it entered, independent of the mass of the ions. Means are provided at the position of the mass spectrum to block ions of certain mass numbers and to allow others to pass, the passed ions being reassembled and exiting the magnet as a parallel beam substantially where it entered, independent of the mass numbers of the ions.

10 Claims, 3 Drawing Sheets



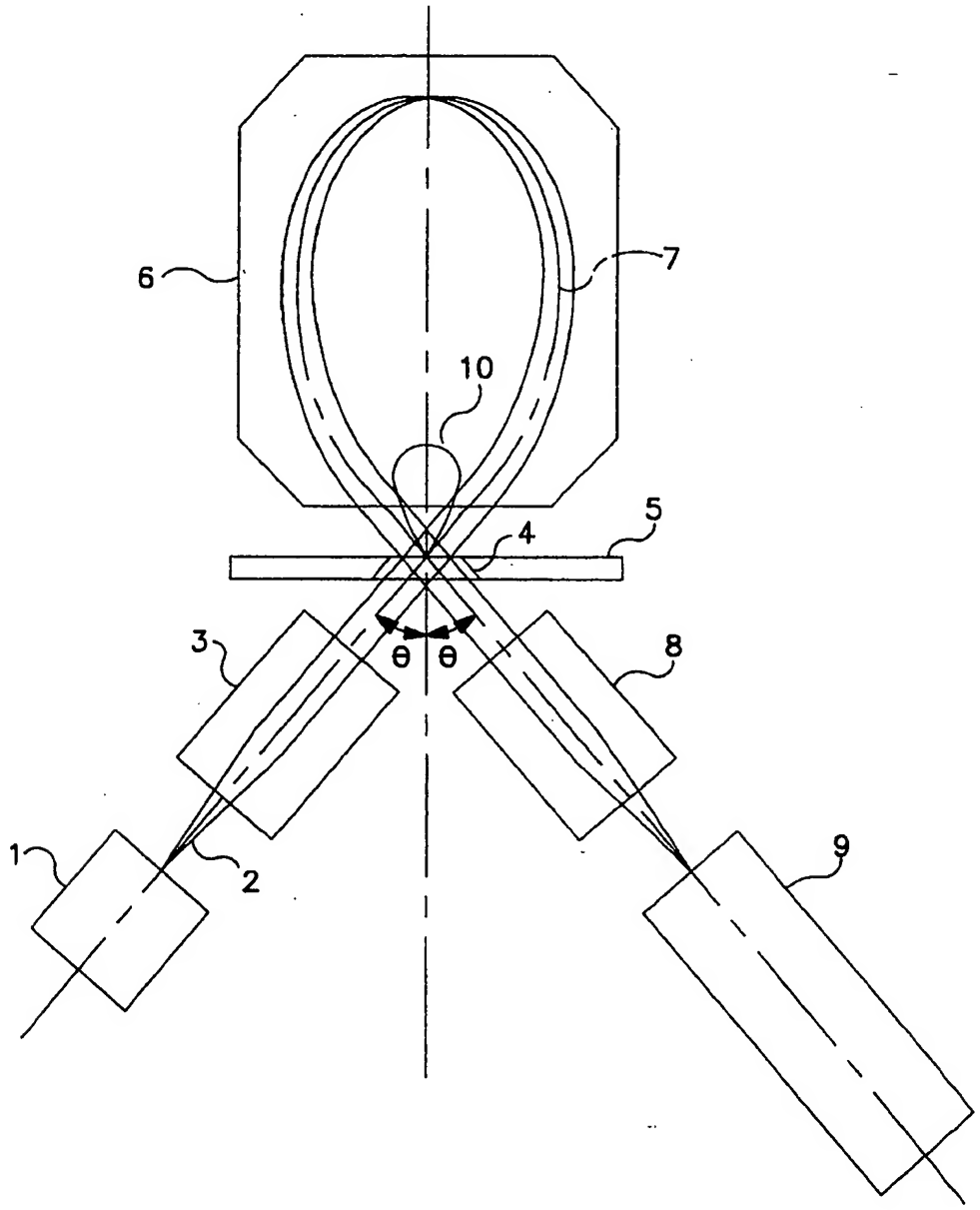


FIG. 1

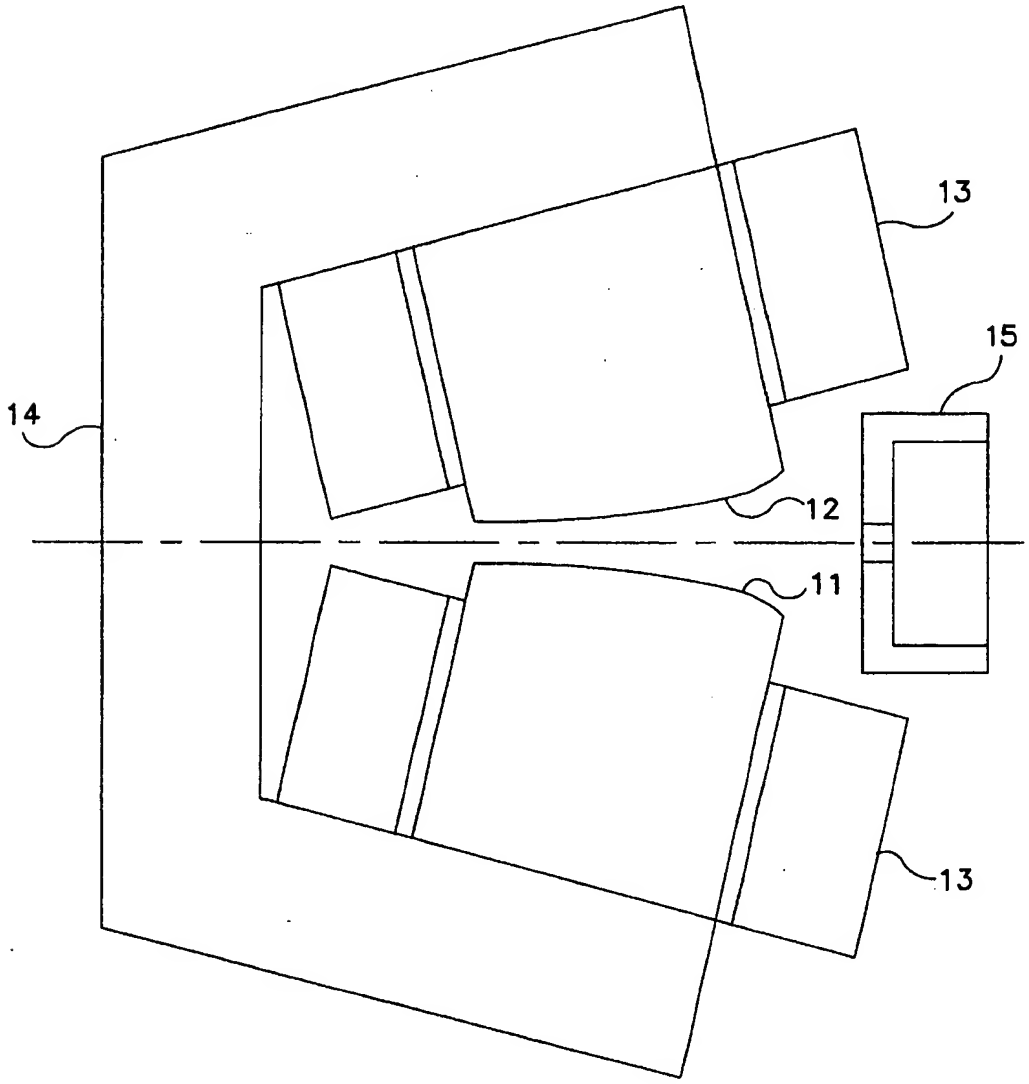


FIG. 2

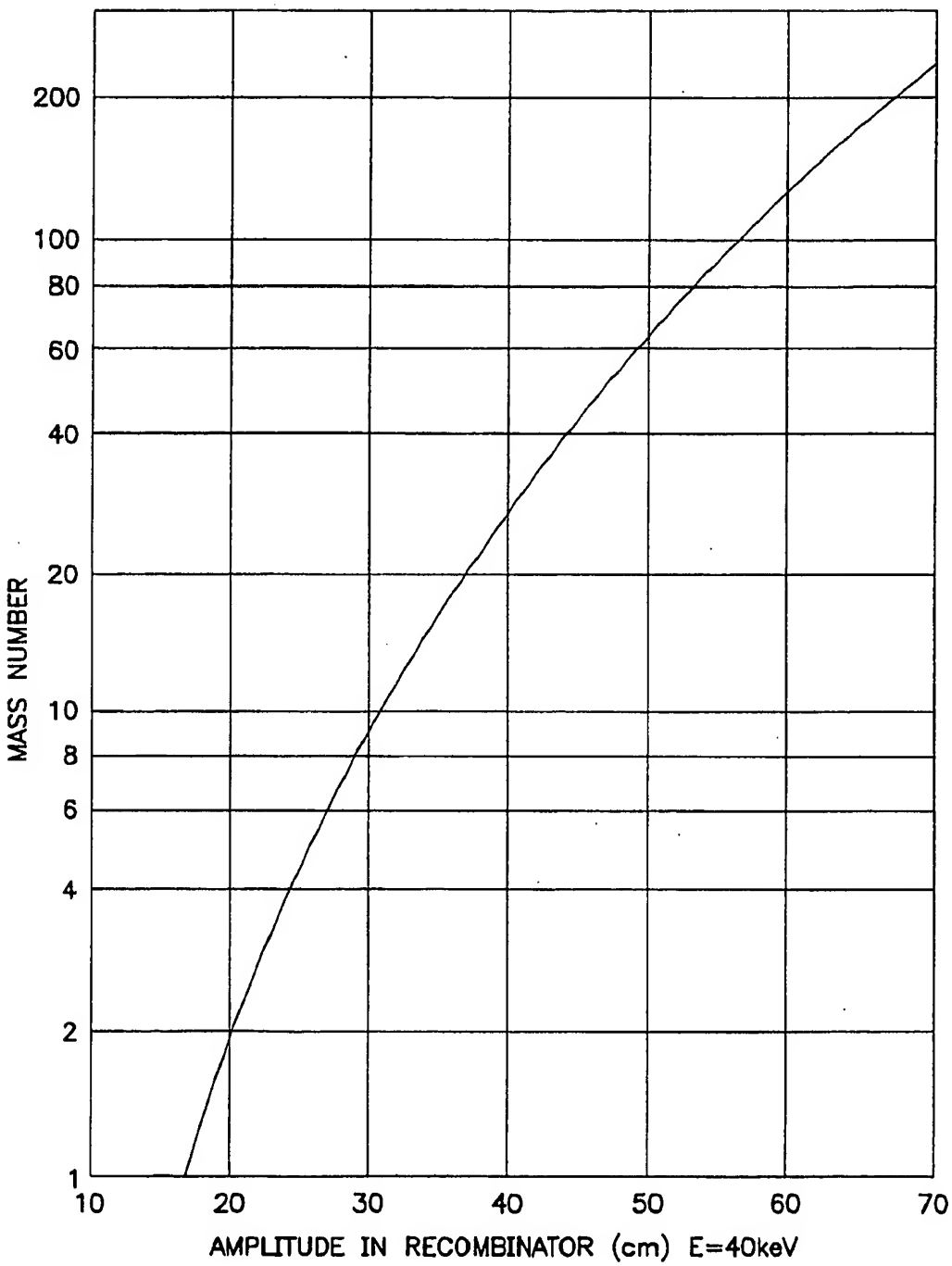

200
100
80
60
40
20
10
8
6
4
2
1
MASS NUMBER
10
20
30
40
50
60
70
AMPLITUDE IN RECOMBINATOR (cm) E=40keV

FIG. 3

MASS RECOMBINATOR FOR ACCELERATOR MASS SPECTROMETRY

FIELD OF THE INVENTION

The present invention relates to accelerator mass spectrometry which generally utilizes a system consisting of a negative ion source, a mass pre-selector, a Tandem Electrostatic Accelerator and a final isotope separator. The preselector serves to reduce the amount of spurious negative ions that enter the Tandem Accelerator. The stripping canal of the Tandem serves the important function of breaking up negative molecular ions in such a manner that only atomic species (with positive charge) continue. The isotope separator (mass selector) finally determines the relative intensities of the selected atomic species.

The present invention describes an electromagnetic system which is to be used as the pre-selector of negative ions of certain mass numbers to be injected into the Tandem accelerator. Another solution to the same problem is described in U.S. Pat. No. 5,013,923 to Litherland et al. entitled "MASS RECOMBINATOR FOR ACCELERATOR MASS SPECTROSCOPY", reference to which is hereby made for prior art disclosures of mass recombinators.

DESCRIPTION OF THE RELATED ART

The age of ancient organic materials can in many cases be determined by measuring the abundance ratio of Carbon-14 to Carbon-13 or to Carbon-12. This is because in living organisms these ratios are in equilibrium with those in the atmosphere, but after the organic material dies, the content of radioactive Carbon-14 decays with a halflife of 5730 years. Similarly, isotope ratios in certain minerals can be used to determine the geological lifetime of those minerals. Accelerator mass spectrometry may also be used to measure small quantities of trace elements in certain materials such as silicon.

Several large Tandem Accelerators, designed for Nuclear Physics research, have been used for dating various materials by determination of isotope ratios. Lately, smaller, dedicated facilities have been put into operation for this purpose.

Most often, the isotope abundance ratios of interest are exceedingly small, as in the case of the ratio for ^{14}C to ^{12}C. As indicated in said U.S. Pat. No. 5,013,923, such ratios may be of the order of one part per trillion (10^{-12}). To increase the accuracy of the measurements, it is generally necessary to make a pre-selection of masses, before the accelerator, and then make a final measurement of the ratios in an isotope separator after acceleration and charge exchange in the Tandem.

In principle it is possible to utilize other accelerators for the purpose herein discussed. However, a dc Tandem accelerator powered by a charged belt (Van de Graaff generator) or by other means, e.g. a cascade rectifier circuit, is ideally suited for the purpose, partially because of the voltage stability of these machines. Therefore, hereinafter the accelerator will continue to be referred to as the Tandem.

SUMMARY OF THE INVENTION

The present invention relates to the pre-selection process. The pre-selector is composed of a 264.6-degree non-uniform dipole magnet with a prescribed non-uniform field, bracketed by two electrostatic lenses or lens systems. The lenses may be electrostatic Einzel lenses or electrostatic quadrupole pairs or triplets, all devices that are well known to workers in the field. The function of the lens system on the entrance side is to present to the dipole magnet a substantially parallel beam, and on the exit side the function of the lens system is to match a parallel beam emerging from the dipole magnet to the entrance of the accelerator tube of the Tandem for optimum transmission, again with purely electrostatic devices. On the entrance side the focusing function may be combined with the accelerating function designed to bring the negative ions up to the desired kinetic energy.

The dipole magnet has a well-defined non-uniform field and all negative ions entering the dipole parallel to the central orbit make a 264.6-degree deflection, independent of mass or energy. Assuming that the ions have the same charge and energy, the orbit amplitude inside the magnet is a function of the mass, and this makes it possible to make a mass selection in the middle of the magnet where a mass spectrum is formed. The magnet is very similar to that described in U.S. Pat. No. 3,243,667 to Enge entitled "NON DISPERSIVE MAGNETIC DEFLECTION APPARATUS AND METHOD", the disclosure of which is hereby incorporated herein by this reference thereto. The central ray for a given mass describes a loop with the entrance and exit points coinciding. The magnet is therefore sometimes referred to as a "Pretzel" magnet. The amplitude of the loop inside the magnet increases monotonically (but nonlinearly) with the mass of the ions. The gradient and angle of incidence in the version discussed here have been selected to produce parallel-to-parallel focusing in both planes, as mentioned above. The magnet disperses a negative ion beam into a mass spectrum in the middle after 132.3-degree deflection. It then re-assembles all species, not purposely blocked, to a parallel beam at the exit, after 264.6 degree deflection.

If the magnet is made large and powerful enough, the mass spectrum along the symmetry line may cover the isotopes of all elements from hydrogen to uranium carrying a charge of −1 electronic units. A selection of masses can be made by a mask with slits or holes at the appropriate places. One can envision dedicated masks made for specific investigations, for instance, a mask with three holes positioned to allow all ions with charge state −1 and masses **12**, **13**, and **14** to pass. Such a mask may comprise a sheet of metal or other material placed at the position inside the magnet at which the ions arrive after deflection of approximately 132.3 degrees.

Since all ions of charge state −1 leave the ion source and pre-accelerator with substantially the same kinetic energy, they can all be substantially focused from point (waist) at the source to parallel at the Pretzel entrance with electrostatic means, as mentioned above. At the exit of the dipole they can be refocused, again with electrostatic means, to a waist positioned to match the ion optics properly to the entrance of the Tandem acceleration tube.

Heretofore the Pretzel magnet has most often been used to deflect an electron beam 270 degrees (effectively 90 degrees) independent of the momentum of the electrons. This type of Pretzel produces in effect a parallel-to-parallel transfer in the median plane (with an inside crossover) and parallel-to-converging transfer in the transverse direction (with an inside crossover.)

In the present case the angle of incidence into the magnetic field—and the field distribution—are both changed slightly, resulting in a tighter loop, but more importantly, a parallel-to-parallel transfer in both planes independent of the momentum of the particles. It is assumed that the particles have the same sign of charge and, of course, that the

momentum divided by charge does not exceed an upper limit.

In accordance with the present invention negative ions—atoms—all with the same charge and the same kinetic energy, but different masses, form a beam diverging from a small opening at the exit of a negative ion source, are accelerated to a fixed kinetic energy and are focused by electrostatic means to a parallel beam which then is directed into the Pretzel magnet. The beam is dispersed inside the Pretzel according to mass but emerges as a single parallel beam and can, if desired, be focused again by electrostatic means to a single small waist, independent of the masses of the particles. An important point here is that the focusing action of electrostatic lenses depends upon E/q (kinetic energy over charge) and is independent of particle mass. Therefore, the complete system can transfer a mixed beam of particles with the same energy and charge, but with different masses, from point to point while being dispersed somewhere en route such that a selection of masses can be made. Furthermore, there is no limit to the range of masses that can be handled by this system, e.g. the range of hydrogen to uranium.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention may best be understood from the following detailed description thereof, having reference to the accompanying drawings, in which:

FIG. **1** is a somewhat diagrammatic horizontal section showing the general layout of a preferred embodiment of the "Pretzel" Recombinator of the invention;

FIG. **2** is a somewhat diagrammatical cross-sectional side view of the "Pretzel" magnet taken along the vertical symmetry plane; and

FIG. **3** is a graph showing a typical case of position versus mass along the vertical midplane of the "Pretzel" magnet of FIGS. **1** and **2** for ions of charge state −1 and 40-keV energy.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. **1** is a general layout of the components of the system. It is, of course, generally understood, that the beam or beams always travel through vacuum, although no vacuum enclosure is shown on the drawing.

Referring now to FIG. **1**, an ion source **1** produces a beam **2** of negative ions which is rendered substantially parallel by an electrostatic cylindrical Einzel lens **3** or other electrostatic focusing device, such as an electrostatic quadrupole pair or triplet.

The ion beam passes through an opening **4** in a "mirror" plate **5** which defines a vertical plane in which the vertical component of the magnetic field is substantially zero. It is then deflected in the field of the magnet, one pole face of which, the South pole face **6**, is shown. After describing a loop **7** the beam exits again through the hole **4**, is focused by the electrostatic lens system **8** which matches it to the entrance ion optics of the Tandem accelerator tube **9**.

The depth of penetration into the magnet is a very non-linear function of mass. For instance, if orbit **7** in FIG. **1** represents mass number **200**, orbit **10** represents mass number **1**.

The magnetic field in the median (horizontal) plane can be expressed as a function of the distance z from the mirror plate as

$$B=B_0(z/a)^n \quad \text{(Eq. 1)}$$

Clearly a is a depth parameter—the distance from the mirror plate at which point $B=B_0$.

Off the median plane, the magnetic field, calculated by expansion from the field in the median plane (Eq. 1), diverges as z approaches zero, except for the case n=1. Mathematically, this problem is circumvented by making n=1 in a narrow zone close to the mirror plate, i.e. for small values of z. In practice, the field in the region of the entering beam is, of course, very weak, and the discontinuity between the two zones of slightly different field description is of little consequence.

With an index n equal to n=0.924 a beam entering at an angle θ equal to 42.3 degrees is deflected by 264.6 degrees and exits at the point of entry. It is clear from FIG. **1** that the angle θ is the angle made by the incident beam with respect to the normal to the mirror plate **5**, so that the incident angle with respect to the mirror plate **5** is (90–42.3) or 47.7 degrees. It is obvious from the symmetry of the system that, in the median plane a parallel beam experiences a cross-over, that is, it goes through a point on the z-axis, and emerges as a parallel beam, independent of the mass of the ion. For the vertical direction, detailed calculations with the aid of the program RAYTRACE show that, for the particular choice made of n-value and incident angle, the transfer of a parallel beam also goes through a parallel-to-point-to-parallel transfer of the vertical displacement, independent of the mass of the ion.

The values of 0.924 for n, 264.6 degrees for total deflection, 132.3 degrees for the location of the symmetry line and 47.7 degrees for the angle of incidence are optimum values, and slight deviations therefrom may be tolerated depending upon the nature of the particular application.

The mirror plate, is described above as necessary for producing the required distribution of the magnetic field for perfect performance. It may be possible to replace it with compensating coils or, in some cases, leave it out, altogether. The latter solution certainly will limit the range of masses of the ions that are correctly or nearly correctly focused.

FIG. **2** is a vertical cut through the magnet of FIG. **1** with South pole **11** (corresponding to South pole **6** of FIG. **1**), North pole **12**, coils **13**, yoke **14**, and mirror **15**. In this example the mirror plate **5** of FIG. **1** has been replaced by a ferromagnetic channel **15** which provides better shielding for the beam in the presumed field free region in front of the magnet.

Having thus described the principles of the invention, together with illustrative embodiments thereof, it is to be understood that although specific terms are employed, they are used in a generic and descriptive sense, and not for purposes of limitation, the scope of the invention being set forth in the following claims.

I claim:

1. A mass recombinator comprising in combination (a) a source of negative ions to be analyzed, (b) means for accelerating negative ions from said source as a beam to substantially the same moderate kinetic energy, (c) electrostatic means for focusing said negative-ion beam to a substantially parallel beam, (d) a dipole magnet having a field pattern designed to deflect a substantially parallel beam of negative ions having substantially the same moderate kinetic energy which is injected into said field pattern at a specified angle of incidence in such a manner that it describes a loop of approximately 264.6 degrees forming a mass spectrum at a position inside the magnet after deflection of approximately 132.3 degrees, and to make the beam exit said field pattern as a parallel beam substantially where

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it entered, independent of the mass of the ions, (e) means for directing said parallel beam into said field pattern at said angle of incidence, and (f) means of blocking ions of certain mass numbers at the position of the mass spectrum and allowing others to pass, the passed ions being reassembled and exiting the magnet as a parallel beam substantially where it entered, independent of the mass numbers of the ions.

2. A mass recombinator in accordance with claim 1, wherein said means for accelerating negative ions includes said electrostatic means for focusing said negative-ion beam.

3. A mass recombinator comprising in combination a dipole magnet having a base line and having a field pattern substantially in accordance with the formula $B=B_0(z/a)^n$ in which z is the distance from the base line, n=0.924 and B_0 and a are other constants, a source of negative ions to be analyzed, means for accelerating negative ions from said source to substantially the same moderate kinetic energy as a beam, electrostatic means for focusing said negative-ion beam to a substantially parallel beam, and means for directing said parallel beam into said field pattern through said base line at an angle of about 47.7 degrees with respect to said base line, whereby said beam of negative ions is deflected in such a manner that it describes a loop of approximately 264.6 degrees forming a mass spectrum at a position inside the magnet after deflection of approximately 132.3 degrees and exits the field as a parallel beam substantially where it entered, independent of the mass of the ions, and means of blocking ions of certain mass numbers at the position of the mass spectrum and allowing others to pass, the passed ions being reassembled and exiting the magnet as a parallel beam substantially where it entered, independent of the mass numbers of the ions.

4. A mass recombinator in accordance with claim 1, including a plate or other device made of high-permeability material and designed so as to define a plane where the vertical component of the magnetic field is substantially zero, said plate or other device having a hole through which the negative ions are injected and extracted.

5. A mass recombinator in accordance with any one of claims 1 through 4, in which the required field distribution is produced by an appropriate shape of the pole pieces.

6. A mass recombinator in accordance with any one of claims 1 through 4, in which the required field distribution is produced by appropriate surface windings on the poles.

7. A mass recombinator in accordance with claim 1 and having further electrostatic focusing means to match the beam optics to the entrance of the electric field of an accelerator.

8. A mass recombinator in accordance with claim 1 in which said electrostatic means for focusing said negative ions is an electrostatic Einzel lens.

9. A mass recombinator in accordance with claim 1 in which said electrostatic means for focusing said negative ions is an electrostatic quadrupole pair.

10. A mass recombinator in accordance with claim 1 in which said electrostatic means for focusing said negative ions is an electrostatic quadrupole triplet.

* * * * *

EXHIBIT B

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte ROGER A. HANSEN

Appeal 2007-3424
Application 10/368,772
Technology Center 1700

Decided: May 13, 2008

Before BRADLEY R. GARRIS, ERIC GRIMES, and ALLEN R. MACDONALD, *Administrative Patent Judges*.

GRIMES, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 involving claims to a decal organization tool, which the Examiner has rejected as anticipated by or obvious in view of the prior art. We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

STATEMENT OF THE CASE

"Many products produced by industry are sufficiently complex, and sometimes even potentially dangerous to a customer, that numerous safety

messages, warning signs, instructions and other notices must be affixed to the product before sale" (Spec. 1). The Specification refers to all such signage, along with informative and decorative signs, as "decals or decal messages" (*id.*).

The Specification discloses "a decal organization tool and process by which all existing decals associated with and required for a particular product or product model are consolidated onto a single large decal sheet" (*id.* at 11). The Specification also discloses "the use of an adhesive which leaves a permanent residue on the product and allows the manufacturer to identify every decal placed on the product even after the decals have been removed" (*id.*).

Claims 2-4, 7, 9-22, and 30-39 are pending and on appeal (Br. 4). Claims 33 and 36 are representative and read as follows:

33. A decal organizational tool for use with a hazardous product which requires a plurality of instructional decals for the education and welfare of a user of the product, the decal organizational tool comprising:

an informational layer having an obverse face and a reverse face and comprising:

a plurality of instructional decals with messages different from one another and descriptively relating to instructional information for the education and welfare of a user of the product, the messages being printed on one of the obverse and reverse faces of the information layer whereby all of the different instructional decal messages will be available to a decal installer as a group of the plurality of decals and can be brought to the product as a group; and

a removal cut surrounding and associated with each different instructional decal that defines an edge of each decal and that permits removal of each associated decal from the information layer; and

an adhesive applied to the reverse face of the information layer; and

a liner sheet releasably retained to the information layer by the adhesive such that the plurality of decals are releasably peelable from the

liner sheet, whereby the liner sheet, when stripped bare of the plurality of instructional decals, becomes an indicator for the decal installer that all the decal messages describing the product on the liner sheet have been applied to the product, thereby assuring that the instructional decal messages will be applied to the product for the education and welfare of the user of the product.

36. The decal organization tool of Claim 33 wherein the adhesive contains an additive responsive to ultraviolet light, such that when at least one of the plurality of decals with a portion of the adhesive is adhered to the product and the at least one decal is thereafter removed from the product, a residue of the additive remains substantially permanently on the product to define a visible footprint on the product and matched to the at least one decal when the ultraviolet light is incident on the product, thereby confirming that a decal message was applied to the product.

The Examiner has rejected claims 2-4, 7, 30, 33, and 34 under 35 U.S.C. § 102(b) as anticipated by Kruchko.[1] The Examiner has rejected claims 2-4, 7, 9-22, and 30-39 under 35 U.S.C. § 103(a) as obvious in view of Kruchko and Mocilnikar.[2] Appellant has argued each of the claims rejected for anticipation separately and has argued the claims rejected for obviousness in twelve groups (Br. 31). The claims argued as a group will stand or fall together. 37 C.F.R. § 41.37(c)(1)(vii).

ANTICIPATION

The Anticipation Issue

Claims 2-4, 7, 30, 33, and 34 stand rejected under 35 U.S.C. § 102(b) as anticipated by Kruchko. The Examiner's position is that Kruchko discloses a product meeting all the structural limitations of the rejected

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[1] Kruchko, U.S. Patent 5,389,476, issued Feb. 14, 1995.
[2] Mocilnikar et al., U.S. Patent 5,346,259, issued Sept. 13, 1994.

claims and the "intended use phrases such as 'for use', 'for the education', 'will be available', etc. have not been given any patentable weight because said phrase[s] are not deemed to be of positive limitation" (Ans. 4).

Appellant responds that the rejected claims contain limitations relating to what is printed on the decals on the claimed tool, and those limitations should be given patentable weight in the anticipation analysis (App. Br. 21-23, 27-29).

In view of these conflicting positions, the anticipation issue presented is: Do the printed matter limitations recited in the rejected claims distinguish the claimed decal organization tool from the decal product disclosed by Kruchko?

Findings of Fact Relating to Anticipation

1. Kruchko discloses a method of making life-sized decals in which a photographic image is digitized and the background of the desired image is digitally removed or masked (Kruchko, col. 3, l. 39 to col. 4, l. 9).

2. The digitized image is divided into image sections separated by registration lines (Kruchko, abstract and col. 4, ll. 32-52).

3. "The image sections are printed onto sheets of a clear medium removably laminated to a backing sheet to form a decal. . . . The clear medium is preferably laminated to the backing sheet by an adhesive which remains on the clear medium after it is removed from the backing sheet." (Kruchko, col. 5, ll. 13-20.)

4. "The printed decal sheets are then die-cut to permit the image sections to be easily removed from the backing sheet. . . . [T]he die-cut rule

can be constructed to leave a border 42 of the clear medium around the image sections. . . . When the image sections are reassembled on a wall, the border 42 will be the same color as the wall." (Kruchko, col. 5, ll. 24-41.)

Discussion of the Anticipation Issue

Based on our findings and those of the Examiner, Kruchko anticipates claims 2-4, 7, 30, and 33. Claim 33 is the broadest of these claims. Claim 33 is directed to a "decal organization tool" comprising two layers (an information layer and a liner sheet) held together by an adhesive. Kruchko's product comprises a clear medium laminated to a backing sheet by an adhesive (FF 3). Claim 33 also requires that the information layer has a plurality of decals printed on it, and that each decal is surrounded by a removal cut. The clear medium of Kruchko's product has a plurality of decals (image sections) printed on it (FF 3), and the decals are surrounded by a removal cut (FF 4).

Thus, Kruchko's product meets all of the structural limitations of claim 33. The remainder of claim 33's description is directed either to the intended use of the claimed product or to nonfunctional printed material that is entitled to no weight in determining patentability.

Specifically, the preamble of claim 33 states that the claimed product is "for use with a hazardous product which requires a plurality of instructional decals for the education and welfare of a user of the product." This preamble language does not limit the structure of the claimed product (although it might help define the printed content of the decals, an issue we will get to shortly). "[W]here a patentee defines a structurally complete

invention in the claim body and uses the preamble only to state a purpose or intended use for the invention, the preamble is not a claim limitation." *Rowe v. Dror*, 112 F.3d 473, 478 (Fed. Cir. 1997).

> The same is true of the claim language stating that
>
> the liner sheet, when stripped bare of the plurality of instructional decals, becomes an indicator for the decal installer that all the decal messages describing the product on the liner sheet have been applied to the product, thereby assuring that the instructional decal messages will be applied to the product for the education and welfare of the user of the product.

Although this language appears in the body of the claim, it also does nothing more than recite an intended use for the claimed product (or what is left of it after the decals are removed) and therefore is not a structural limitation.

Claim 33 also states that the decals are printed on the information layer "whereby all of the different instructional decal messages will be available to a decal installer as a group of the plurality of decals and can be brought to the product as a group." This claim language merely states the result of a structural limitation; specifically, having a plurality of decals printed on a single sheet. "A 'whereby' clause that merely states the result of the limitations in the claim adds nothing to the patentability or substance of the claim." *Texas Instruments, Inc. v. U.S. International Trade Comm.*, 988 F.2d 1165, 1172 (Fed. Cir. 1993).

Finally, claim 33 states that the claimed product includes "a plurality of instructional decals with messages different from one another and descriptively relating to instructional information for the education and welfare of a user of the product" to which the decals are intended to be attached. The weight to be given to this claim limitation is the central issue

in this appeal. The Examiner gives this limitation no patentable weight (Ans. 4); Appellant cites *In re Gulack*, 703 F.2d 1381 (Fed. Cir. 1983), as supporting his position that the printed content of the decals distinguishes the claimed product from the prior art (App. Br. 28-29).

> Appellant argues that claim 33 meets the *Gulack* test because
>
> the instructional information is related to the decals in at least two ways. First, the decals support the instructional information. See [*Gulack*]. (Federal Circuit held that digits have a functional relationship with the band on which they are printed in part because the band supports the digits). Second, the decals are sized and shaped to be applied to particular locations on the product to which the instructional information relates. Accordingly, the instructional information would not achieve its purposes of promoting the education and welfare of a user of the product without the decals, and the decals would not provide the desired result without the instructional information. Thus, the instructional information does have a functional relationship with the substrate, that is, the decals themselves.

(App. Br. 29.)

We agree with Appellant that *Gulack* provides the appropriate test for determining whether limitations defining descriptive material should be given patentable weight, but disagree with Appellant on how the instant claims fare under that test. The invention claimed in Gulack comprised "three key elements: (1) a band . . .; (2) a plurality of individual digits imprinted on the band or ring at regularly spaced intervals; and (3) an algorithm by which the appropriate digits are developed." *Id.* at 1382. The band was printed with the digits generated by the algorithm and could be used "to perform magic tricks or to display various aspects of number

theory." *Id.* at 1383. The claims had been rejected as obvious based on prior art that taught a band with different material printed on it. *Id.* at 1384.

The court stated that limitations reciting printed matter cannot be ignored but "[w]here the printed matter is not functionally related to the substrate, the printed matter will not distinguish the invention from the prior art in terms of patentability. Although the printed matter must be considered, in that situation it may not be entitled to patentable weight." *Id.* at 1385 (footnote omitted). The "critical question is whether there exists any new and unobvious functional relationship between the printed matter and the substrate." *Id.* at 1386.

In *Gulack*, the court held that the substrate and printed matter had such a relationship because the looped structure of the substrate and the particular digits printed on it interrelated to give the claimed article a property it would not have had if either the structure or the digits were changed. Therefore, the content of the printed matter was held to produce a nonobvious difference between the claimed product and the prior art.

We disagree with Appellant's position that the printed matter and substrate of claim 33 share a "novel and unobvious functional relationship" like that of the product in *Gulack*. The printed matter and the substrate of the article defined by claim 33 have the same relationship as any other decal (or set of decals) has with its substrate: the decal is printed on one layer of the substrate, and the other layer of the substrate provides a backing from which the decal can be peeled when a user wants to apply it to something. There is nothing "novel and unobvious" about that relationship.

In our view, the facts of this case are more similar to those of *In re Ngai*, 367 F.3d 1336 (Fed. Cir. 2004). The claims at issue in *Ngai* were directed to a kit that differed from the prior art only in the content of printed instructions that were included with it. *Id.* at 1337. The court held that the claimed kit did not meet the *Gulack* test: "In *Gulack*, the printed matter would not achieve its educational purposes without the band, and the band without the printed matter would similarly be unable to produce the desired result. Here, the printed matter in no way depends on the kit, and the kit does not depend on the printed matter. All that the printed matter does is teach a new use for an existing product." *Id.* at 1339.

The same analysis holds here. The instant Specification states that decals are peeled off their liner sheet when a user wants to apply them (Spec. 5-6, 20). Whether the decals are on individual sheets or on one big sheet does not change the relationship between the printed matter and the substrate. Just as in *Ngai*, all the printed matter defined by claim 33 does is teach a new use for a known product – a substrate comprising multiple decals. *Cf. Ex parte Nehls*, 2008 WL 258370 (BPAI 2008, precedential) (particular nucleic acid sequences in a computer database are nonfunctional descriptive material because they are not functionally related to the computer system that compares a target sequence to sequences in a database).

Claim 34 depends from claim 33 and "further includ[es] a support device for holding the information layer and the liner sheet in an upright orientation for the convenience of the decal installer."

Appellant argues that "[i]t is clear from inspection that Kruchko does not teach or disclose the claimed support device" (Br. 30).

The Examiner responds that a "surface on which the decal tool is laid on will provide as a supporting device" (Ans. 4). That may well be true, since the intended use language of claim 34 is not a claim limitation, and all the claim actually requires is a device *capable of* supporting the article of claim 33 in an upright orientation.

The issue with respect to anticipation, however, is whether Kruchko discloses such a device. The Examiner has pointed to no specific passage in Kruchko that describes the disclosed decal product combined with a device that is capable of holding it in an upright orientation. We are therefore compelled to reverse the rejection of claim 34 for anticipation.

Claim 30 is similar to claim 33 but adds two limitations:

- "a border associated with each of the plurality of instructional decals that at least partially surrounds one of the plurality of instructional decals, each border of adjacent decal being spaced from one another by an intervening gap," and

- "a product match margin located in at least one of the intervening gaps and contacting the border of one of the decals, the product match margin matching the predetermined color of the product such that when the decal is affixed to the product and is viewed at a distance from the product by a human viewer, the product match margin will color match the predetermined color of the product and no portion of the decal outside the associated border visually color contrasts substantially with product, thereby effectively visually concealing any irregular margin between the border and the removal cut."

The Specification states that the border associated with the decals can take a variety of forms: among other things, it can be a "simple line border" or a "filled interior border . . . in which the border is literally defined by the

darkened or colored background of the decal message" (Spec. 20). Claim 7 depends on claim 30 and specifies that the border is a "line border."

The Specification describes the "product match margin" as a margin surrounding the decal message(s) that is either colored to match the product to which the decal is intended to be applied, or is "transparent so that . . . the color of the product will be visible through such transparent margin" (Spec. 13). Claims 2-4 depend on claim 30 and specify that the product match margin is colored.

We agree with the Examiner that Kruchko's product has both a border and a product match margin, as required by claim 30. Kruchko teaches that the decals are die-cut "to leave a border 42 of the clear medium around the image sections" (FF 4). The instant Specification expressly teaches that product match margins can be transparent.

Appellant argues that Kruchko's product lacks a "product match margin" because the registration marks disclosed by Kruchko for use in reassembling the life-size decal "must be visually distinguishable from the product in order to be useful in ensuring proper registration" (*id.* at 22). This argument is unpersuasive, because Kruchko teaches that, because of the transparent border, "[w]hen the image sections are reassembled on a wall, the border 42 will be the same color as the wall" (Kruchko, col. 5, ll. 24-41); i.e., Kruchko's border 42 is a product match margin.

Kruchko's product also has a border associated with each decal. As shown in Kruchko's figures, the border is a simple line border (see, e.g., Kruchko, Fig. 4A). The figures are line drawings rather than photographs, but in any event, even if the images on the decals were photographs, the

edge of each image would form what the instant Specification refers to as a "filled interior border"; i.e., a border that is "literally defined by the darkened or colored background of the decal."

Appellant argues that Kruchko "does not disclose Applicant's claimed continuous border surrounding the 'information.' The arm or leg which has been properly treated by the Examiner as being the 'information' . . . cannot also be read as being Applicant's claimed 'border,' which is described in Applicant's claim as spaced from the 'information.'" (App. Br. 21-22.)

This argument is unpersuasive. Claim 30 requires the borders of *adjacent* decals to be spaced from each other, but does not require the border of a given decal be spaced from any other part of the decal. Claim 30 therefore encompasses the "filled interior border" described in the Specification.

Finally, Appellant argues that the printed matter limitations of claim 30 distinguish it from the prior art for the same reason as claim 33's printed matter limitations. For the reasons discussed above, we disagree.

Claims 2-4 differ from the product expressly disclosed by Kruchko, in that the claims require a colored border rather than Kruchko's transparent border. Claim 7 may also differ from Kruchko's express disclosure, in that a line border (as required by claim 7) would not necessarily result from following the digital photographic process described by Kruchko.

In each case, however, the difference between what is claimed and what is taught in the prior art is no more than a difference in the content of printed matter. When that is the case, the *Gulack* test applies: the claimed

product is unpatentable over the prior art unless the substrate and the printed matter have a "new and unobvious functional relationship."

We do not find such a relationship here. A colored decal margin has the same functional relationship to its substrate as a transparent margin, and the same is true of a line border and a filled interior border. Making part of a product one printed matter color rather than another, or surrounding part of a product with a particular type of printed matter border, without more, does not render the product patentable over prior art that is otherwise identical.

OBVIOUSNESS

The Obviousness Issue

Claims 2-4, 7, 9-22, and 30-39 stand rejected under 35 U.S.C. § 103(a) as obvious in view of Kruchko and Mocilnikar. The Examiner reasons that Mocilnikar discloses an adhesive that contains an additive responsive to ultraviolet light, and it would have been obvious to use Mocilnikar's adhesive in Kruchko's decal product (Ans. 5).

Appellant responds that Mocilnikar's adhesive can be combined with Kruchko's decal product only with the benefit of hindsight based on the instant disclosure, and therefore the references do not support a prima facie case of obviousness (Br. 34-35).

In view of these conflicting positions, the obviousness issue presented is: Would it have been obvious to a person of ordinary skill in the art to use the ultraviolet-detectable adhesive disclosed by Mocilnikar as the adhesive in the decal product disclosed by Kruchko?

Findings of Fact Relating to Obviousness

5. Mocilnikar discloses a tamper-proof label (Mocilnikar, col. 1, ll. 5-7).

6. Mocilnikar's label includes, among other things, "an aggressive adhesive layer on the back of the label in order to permanently adhere to goods" (Mocilnikar, col. 3, ll. 16-18).

7. Mocilnikar describes the adhesive layer more specifically as "a white pigmented pressure sensitive, ultra cross-linked acrylic adhesive layer 44. . . . The acrylic adhesive layer 44 has high shear characteristics, temperature resistance up to approximately 220° C, and leaves a residue producing a footprint which appears bluish-white when illuminated with a 365 nanometer (nm) blacklight source." (Mocilnikar, col. 5, ll. 48-59.)

8. The instant Specification characterizes Mocilnikar's technique as "utilizing ultraviolet light and an appropriate light-sensitive additive" (Specification 10).

9. Mocilnikar discloses that appropriate acrylic adhesives were commercially available (Mocilnikar, col. 5, l. 65 to col. 6, l. 2).

Discussion of the Obviousness Issue

Based on our findings and those of the Examiner, we conclude that a person of ordinary skill in the art would have considered it obvious to use Mocilnikar's acrylic adhesive in Kruchko's decal product. Mocilnikar discloses that acrylic adhesives were known and commercially available at the time the instant application was filed (FF 7, 9). Mocilnikar also discloses that the acrylic adhesives are aggressive adhesives that will

permanently adhere a label to a substrate (FF 6). In view of these disclosures, a person of ordinary skill in the art would have considered it obvious to combine the known, commercially available adhesive disclosed by Mocilnikar with the decal product disclosed by Kruchko in order to allow for permanent mounting of the full-size decal created by Kruchko's product.

"The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1739 (2007). "[W]hen the question is whether a patent claiming the combination of elements of prior art is obvious," the relevant question is "whether the improvement is more than the predictable use of prior art elements according to their established functions." *Id.* at 1740.

Here, the combination of Mocilnikar's adhesive with Kruchko's decal product is no more than the predictable use of prior art elements – an adhesive and a sheet of decals – according to their established functions. The evidence of record also shows that the Mocilnikar's adhesive contains an additive responsive to ultraviolet light, as recited in claim 36 and other claims on appeal. Those claims are therefore prima facie unpatentable under § 103 based on the cited references.

Appellant argues the claims in several groups (Br. 31). The first group argued is claims 30, 33, and 38. We will consider claim 33 to be representative of this group; claim 38 will stand or fall with claim 33. 37 C.F.R. § 41.37(c)(1)(vii). Although Appellant grouped claim 30 with claims 33 and 38, he also presented separate arguments for claim 30, which we also address below.

Appellant argues that Kruchko does not teach or suggest certain limitations of claim 33 (Br. 35-37) and "Mocilnikar fails to disclose or suggest the missing elements" (*id.* at 38). As discussed above with regard to the rejection under 35 U.S.C. § 102(b), however, we find that Kruchko anticipates claim 33. Anticipation is the epitome of obviousness. *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983).

Although Appellant grouped claims 30 and 33 together, he also argued that claim 30 contains additional limitations (Br. 39). Appellant argues that the printed matter limitations of claim 30 are not taught by Kruchko. This argument is addressed above with respect to the rejection for anticipation.

Appellant also argues that claim 30 would not have been obvious because Mocilnikar does not teach a product match margin and that the products of Kruchko and Mocilnikar are so different that a person of ordinary skill in the art would not have been led to combine them (Br. 39-40). These arguments are not persuasive because, as discussed above, the teaching of a product match margin is provided by Kruchko and we conclude that the combination of Mocilnikar's adhesive and Kruchko's decal product would have been a predictable use of prior art elements, and therefore obvious.

We therefore affirm the rejection of claims 30 and 33 as unpatentable under 35 U.S.C. § 103 in view of Kruchko and Mocilnikar. Claim 38 falls with claims 30 and 33.

Appellant argues claims 2, 3, and 4 separately but the argument is similar for each claim: Appellant argues, essentially, that the references do

not teach a product match margin that is colored (Br. 40-43). With respect to claim 7, Appellant argues that the references do not teach or suggest a line border around decals (*id.* at 43-44).

Each of these arguments is unpersuasive for the reason discussed above with respect to the anticipation rejection: For printed matter to be entitled to patentable weight under *In re Gulack* it must have a "new and unobvious functional relationship" with its substrate. A colored product match margin and a line border do not meet the *Gulack* test because they have the same functional relationship to their substrate as a transparent margin and a filled interior border, and therefore are not entitled to patentable weight. These printed matter limitations therefore do not patentably distinguish the claimed product from the product that is made prima facie obvious by the prior art.

With respect to claim 9, which requires that the decal have a colored background, Appellant argues that the references do not teach a colored background or concealing an irregular margin around one (with a product match margin) (*id.* at 44-45).

These arguments are unpersuasive. Kruchko discloses that its decals are derived from photographs, so they would have backgrounds of several different colors. Necessarily, at least part of the background (i.e., the photograph enlarged to form the decal) would be a different color from any surface the decal would be mounted on. Appellant's argument with respect to the product match margin has been addressed already.

Appellant argues claims 10, 16, 36, and 39 as a group (Br. 31). Claim 36 is representative of these claims, and is directed to the product of claim

33 with an adhesive that contains an additive responsive to ultraviolet light. Appellant argues that the cited references do not suggest including an ultraviolet-responsive additive in an adhesive in order to address the potential product liability issue caused by missing decals (*id.* at 46-48)

This argument is not persuasive. It is true that neither Kruchko nor Mocilnikar discusses product liability litigation or missing decals on hazardous products. But the prior art does not have to suggest combining references for the same reason that a patent applicant combined them in order to support a prima facie case of obviousness. *See KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741-42 (2007) ("In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls. . . . [A]ny need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed."). *See also In re Dillon*, 919 F.2d 688, 692-93 (Fed. Cir. 1990) ("[T]he statement that a *prima facie* obviousness rejection is not supported if no reference shows or suggests the newly-discovered properties and results of a claimed structure is not the law.").

The fact that Mocilnikar's acrylic adhesive leaves a residue that is visible under ultraviolet light, and that this property can be advantageous for decals on hazardous products, is not the only reason that those of skill in the art would combine it with Kruchko's decal product. As discussed above, Mocilnikar also discloses that the adhesive was commercially available and permits permanent mounting of a label (or decal) on a substrate. Those of ordinary skill in the art would have considered it obvious to use the adhesive

for its properties as an adhesive, whether or not it was responsive to ultraviolet light.

Appellant also argues that

> [a]nother important purpose of Applicant's invention as recited particularly in Claim 36, and which is associated with the claimed printed matter limitations, is providing an assembly and transport mechanism that assures that all the essential decal messages required by a specific hazardous product arrive as a group so they will be available as a group to the installer at the site to be affixed to the hazardous product.

(Br. 48-49.)

As we understand it, Appellant's argument is that the claimed product is distinguished from the prior art because of the printed matter contents of the decals that are printed on it. This argument is unpersuasive for the reasons discussed above.

Appellant argues claims 11, 12, 17, and 37 as a group (Br. 31) but also presents separate argument with respect to claim 12, which is addressed below. Claim 37 is representative of these claims, and is directed to the product of claim 36 where "each removal cut has continuous regular edges except for a predetermined irregularity zone unique to each of the plurality of decals." Appellant argues that the irregularity zone, combined with the ultraviolet-responsive adhesive, allows a manufacturer to prove that a specific label had been attached to a product (Br. 51-52). Appellant argues that the cited references do not teach that recited structure because the "term 'regular edge' describes substantially regular geometric configurations, such as square, rectangles," etc., whereas Kruchko has "virtually random" edges and Mocilnikar lacks an irregularity zone (*id.* at 52).

The instant Specification does not define the terms "continuous regular edge" or "irregularity zone," although the Specification refers to Figure 7 as exemplary. Figure 7 shows two decals that are rectangular with rounded corners, and that have two or three square protrusions on the bottom edge. The Specification states that the "combination of protrusions and the spacing between the protrusions allow the creation of a specific footprint unique to each decal message" (Spec. 30). The Specification also states that the irregularity zone can take a variety of forms (*id.* at 30-31).

In our opinion, the decals disclosed by Kruchko meet the limitations of claim 37. The edge of each of the decals is continuous, in that a removal cut completely surrounds each decal (Kruchko, col. 5, ll. 30-42). Each of the decals includes protruding areas that contain registration marks 34 and that help to create a specific footprint unique to each decal (*id.* at col. 5, ll. 48-52; Fig. 4A). To the extent that the term "regular edge" limits the scope of the claim, Kruchko's exemplary embodiments include decals that have edges that are straight lines (e.g., at the points where the different decals are intended to be overlapped), and a straight edge would reasonably appear to be a "regular edge" (*id.* at Fig. 4A). The language of claim 37, when given its broadest reasonable interpretation consistent with the Specification, encompasses the product made prima facie obvious by the prior art.

Appellant argues "Claim 12 contains a further limitation and does not stand or fall with" claims 11, 17, and 37 (Br. 53). Claim 12 specifies that the irregularity zone is "in the product match margin such that each irregularity zone blends with the predetermined color of the product and is

substantially visually concealed when the decal is adhered to the product." Appellant argues that

> neither Kruchko nor Mocilnikar disclose Applicant's irregularity zone positioned on the margin of the decal message and wherein the irregularity zone is provided with the color of the product so as to make the structural features of the irregularity zone virtually unnoticeable on both liner sheet and on the product by having them blend closely with the predetermined color.

(Br. 53.) Appellant presents a similar argument with respect to claims 21 and 22, which also require that the irregularity zone "blends with the product predetermined color and is visually concealed when the plurality of decals is adhered to the product" (see Br. 55-56).

This argument is not persuasive. The protruding areas containing the registration marks 34 shown in Kruchko's exemplary embodiments meet the limitations of an irregularity zone and are located completely in the transparent margins of the decals. They would therefore blend with the color of the wall and make the irregularity zone "substantially visually concealed" when Kruchko's decal was mounted on a wall or other surface. The protrusions therefore meet the limitations of claims 12, 21, and 22.

Appellant argues claims 13-15 and 18-20 as a group (Br. 31). Claim 18 is representative of this group and is directed to a decal product including, among other things, decals that have a regular edge except for an irregularity zone, "wherein each irregularity zone includes at least one protrusion extending outward from the edge of the associated decal." Appellant argues that "[t]hese structural features define a coding structure which, in combination with the footprint producing residue, allows each

decal message footprint to be distinguished from the footprints of other decal messages" (Br. 54).

We disagree with Appellant's interpretation of the claim language. Claim 18 does not require a system of protrusions that "define a coding structure." It requires only that the irregularity zone include a protrusion. The decals in Kruchko's exemplary embodiments all have protrusions; specifically, the protrusions that contain the registration marks 34 (Kruchko, Fig. 4A). These protrusions meet the limitation of claim 18.

Appellant argues claims 31 and 34 as a group (Br. 31). Claim 34, which is representative of this group, is directed to the decal product of claim 33, further including a support device for holding it upright. Appellant argues that the "examiner has not identified any structure in these [cited] references which serves as such a support device" (Br. 57-58).

The recitation in claim 34 of the intended use of the support device is not a claim limitation. Claim 34 requires only that the support device be *capable of* supporting the product of claim 33 in an upright orientation. Kruchko teaches that conventional methods for making life-sized reproductions include enlarging a photograph on a poster board or a rigid substrate (Kruchko, col. 1, ll. 12-26). Based on the known methods of mounting life-size reproductions on poster board or a rigid substrate and Kruchko's disclosure of assembling a set of decals to reproduce a life-sized image, it would have been obvious to combine Kruchko's decal product with a poster board or rigid substrate large enough to reassemble the life-sized image on it, in order to mount it in places other than a building's wall and to allow it to be moved around. A poster board or rigid substrate would be

capable of supporting Kruchko's decal product in an upright orientation and therefore meets the limitation of claim 34.

Appellant argues claims 32 and 35 as a group (Br. 31). Claim 35, which is representative of this group, is directed to the decal product of claim 33, comprising at least six decals. Appellant argues that "Kruchko does not disclose six different unrelated instructional decal messages. Mocilnikar has more than six decal messages but such messages are all identical" and the references cannot be properly combined (Br. 58).

This argument is not persuasive. For the reasons discussed above, the content of the printed matter of the claimed product is not entitled to patentable weight, and therefore does not distinguish the claimed product from the prior art. Kruchko teaches that its disclosed decal product is made by dividing a full-size image into sections that can be printed by a printing press on a single sheet (Kruchko, col. 4, ll. 19-46), then reassembled into a full-size image. It would have been obvious to those of ordinary skill in the art, based on Kruchko's disclosure, to divide a full-size image into any number of sections, including six, in order to fit the full-size image onto a single sheet for a printing press.

SUMMARY

We reverse the anticipation rejection with respect to claim 34 but affirm it with respect to claims 2-4, 7, 30, and 33. We affirm the rejection under 35 U.S.C. § 103. Because our reasoning differs substantially from that of the Examiner, however, we designate both affirmances as new grounds of rejection under 37 C.F.R. § 41.50(b).

TIME PERIOD FOR RESPONSE

This decision contains a new ground of rejection pursuant to 37 CFR § 41.50(b) (effective September 13, 2004, 69 Fed. Reg. 49960 (August 12, 2004), 1286 Off. Gaz. Pat. Office 21 (September 7, 2004)). 37 CFR § 41.50(b) provides "[a] new ground of rejection pursuant to this paragraph shall not be considered final for judicial review."

37 CFR § 41.50(b) also provides that the Appellant, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of the appeal as to the rejected claims:

> (1) *Reopen prosecution.* Submit an appropriate amendment of the claims so rejected or new evidence relating to the claims so rejected, or both, and have the matter reconsidered by the Examiner, in which event the proceeding will be remanded to the Examiner. . . .
>
> (2) *Request rehearing.* Request that the proceeding be reheard under § 41.52 by the Board upon the same record. . . .

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

Ssc:

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